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Nonconventional soil additives

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Every year in Iowa, products are touted to producers as being the cure for crop production and economic woes. The old adage states "If it sounds too good to be true, then it probably is." How do you know whether a particular product is a viable fertilizer and supplies crop nutrients, or has some proven effect on soil that will improve productivity? The standard advice is to demand unbiased research results that document all claims, and to discount testimonials. If well-documented research isn't available, then be suspicious of claims.

In Iowa, there are laws and rules administered by the Iowa Department of Agriculture and Land Stewardship (IDALS) for review and register of fertilizer and soil conditioner products. So your first question should be, "Is this product registered for the claims made?" Check with the IDALS Feed and Fertilizer Bureau to find out by contacting Terry L. Jensen at (515) 281-8599 or terry.jensen@idals.state.ia.us.

Fertilizers

According to the Iowa Fertilizer Law (Chapter 200), the definition of fertilizer is "any substance containing one or more recognized plant nutrient which is used for its plant nutrient content and which is designed for use and claimed to have value in promoting plant growth …" Fertilizers have a guaranteed analysis that is "the minimum percentage of plant nutrients claimed and reported as total nitrogen (N), available phosphorus (P) or P_2O_5 or both, soluble potassium (K) or K_2O or both." According to the Fertilizer and Agricultural Lime Rule (Chapter 43), specific additional plant food elements beside N, P, and K can be guaranteed: calcium, magnesium, sulfur, boron, chlorine, cobalt, copper, iron, manganese, molybdenum, sodium, and zinc. There is a minimum analysis (Table 1). For mixed fertilizers, the sum of the guaranteed analysis of total N, available P_2O_5, and soluble K_2O must be 20 percent or greater. Thus, materials below these levels cannot be registered as a fertilizer (this rule does not apply to specialty fertilizers for nonfarm use or materials ordinarily applied directly to plant foliage).

Soil conditioners

According to Chapter 200, the definition of soil conditioner is "any substance which when added to the soil or applied to plants will produce a favorable growth, yield or quality of crop or soil flora or fauna or other soil characteristics, other than a fertilizer, recognized pesticide, unmanipulated animal and vegetable manures or calcium and magnesium carbonate materials used primarily for correcting soil acidity." According to Chapter 43, product claims may be substantiated by one of two methods: 1) efficacy testing or 2) available research data

relevant to Iowa crops and soils. Efficacy testing information includes the following:

1. guaranteed ingredients;
2. crop or soil response measured;
3. research facility and investigators conducting trials;
4. dates and locations of trials;
5. trials conducted using the principles of experimental design and methods consistent with those in agricultural research, including raw data from proper treatment selection, replication, and randomization so that statistical analysis can be performed; and
6. no consumer testimonials.

Fertilizer and soil conditioners submitted for registration may be required to be tested for a minimum of two growing seasons in at least three Iowa crop reporting districts. The results of testing are reviewed by the secretary's pesticide and fertilizer advisory committee.

The bottom line is to ask whether a product being promoted is registered with the state, and if it isn't, then to question why and check with IDALS. Also, registrations can be reviewed to determine that a product meets the claims for which the registration was originally granted, and registrations can be cancelled if evidence exists that fraudulent or deceptive practices have been used.

If you want to access research results on specific products, the North Central Region Experiment Station committee NCR-103, "Non-Traditional Soil Amendments and Growth Stimulants," publishes a compendium and two supplements, titled "Compendium of Research Reports on Use of Non-Traditional Materials for Crop Production." These publications are available from the Iowa State University Iowa State University Extension Distribution Center by calling (515) 294-5247 or via pubdist@iastate.edu, http://www.extension.iastate.edu/pubs, or county extension offices. Also, this committee compiles a listing of "Nonconventional Soil Additives: Products, Companies, Ingredients, and Claims," which is available on the Web at http://www.soils.wisc.edu/extension/hottopics/index.htm. Laws and rules administered by the Feed and Fertilizer Bureau of IDALS can be found at http://www.agriculture.state.ia.us/FertLawsRules.htm.

In summary, be wary of products with claims that seem extraordinary relative to common wisdom and known research. In Iowa, we are blessed with highly productive soils that have many attributes to support good crop productivity. It is the rare soil amendment that might further enhance the natural soil attributes. Supplementing the soil supply of crop nutrients when needed or replacing nutrients removed through crop harvest with guaranteed analysis fertilizer products, manure, or liming materials is a well-documented and research supported activity. Attempting to change soil through soil amendments for common field crops typically is not.

Table 1. Minimum percentage of nutrient content for fertilizers to be offered for sale, sold, or distributed in Iowa.

Element	%
Nitrogen (N)	15
Phosphorus (P_2O_5)	15
Potassium (K_2O)	18

Calcium (Ca)	1.00
Magnesium (Mg)	0.50
Sulfur (S)	1.00
Boron (B)	0.02
Chlorine (Cl)	0.10
Cobalt (Co)	0.0005
Copper (Cu)	0.05
Iron (Fe)	0.10
Manganese (Mn)	0.05
Molybdenum (Mo)	0.0005
Sodium (Na)	0.10
Zinc (Zn)	0.05

Adapted from Chapter 200 and 43, IDALS.

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